

Mid Term Exam

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Subject: Design and Analysis of Algorithm

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Design & Analysis of Algorithms

Q. How would you be defining a linked list?

Linked List:-

A linked list is a sequence of data structure which are likewise a wire connected. They are arranged in a linear linear order. Linked list provides a simple & flexible representation of a dynamic set.

There are three types of linked lists

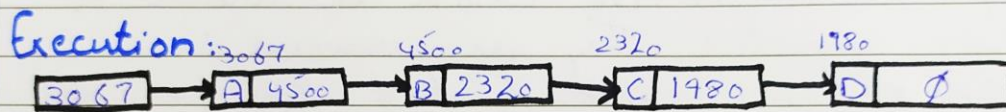
- Simple (one way) linked list: Only forward navigation
- Doubly (two way) linked list: Forward and backward
- Circular (End to End connected) linked list: Last item contains elements as next and the first element has a link to the last element as previous.

Basic Operations performed by linked list are:

- Insertion
- Deletion
- Display

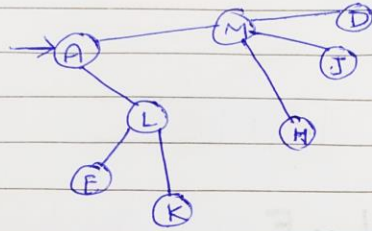
b Design a diagrammatic One Way linked list for the given data

Note #	Note Address	Node Data
1	3067	A
2	4500	B
3	2320	C
4	1980	D

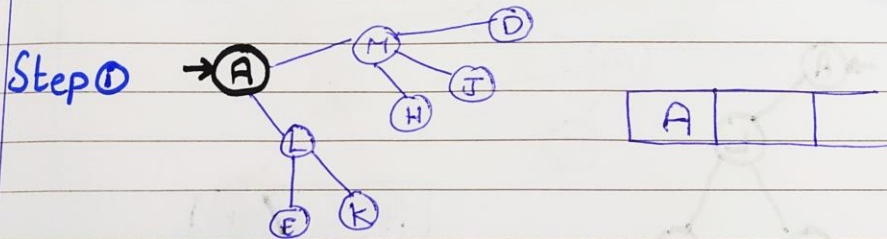


- ① $P \leftarrow \text{getnode}$
- ② $\text{Head} \leftarrow P$
- ③ $\text{Info}(P) \leftarrow \text{data}$
- ④ $\text{Link}(P) \leftarrow \emptyset$
~~(3067)(4500)(2320)(1980)~~
- ⑤ $q \leftarrow P$ (3067) (4500) (2320) (1980)
- ⑥ $x \cdot y \cdot y \cdot y \cdot N$
- ⑦ $P \leftarrow \text{getnode}$ (~~4500~~) (~~2320~~) (1980)
- ⑧ $\text{Link}(q) \leftarrow P$ (~~4500~~) (~~2320~~) (1980)
- ⑨ goto 3
- ⑩ Exit.

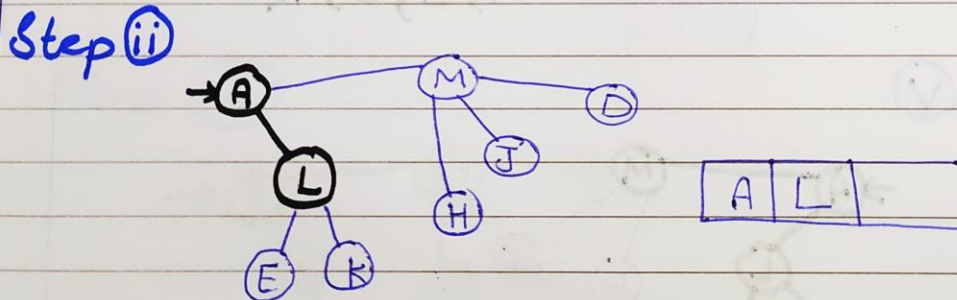
Q2 Apply Depth-first Technique on the given tree.



Solution.



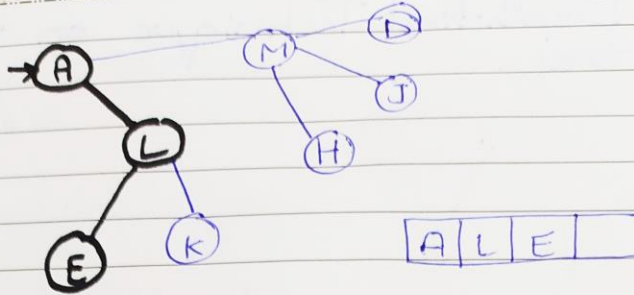
Output Sequence: A,



Output Sequence: A, L,

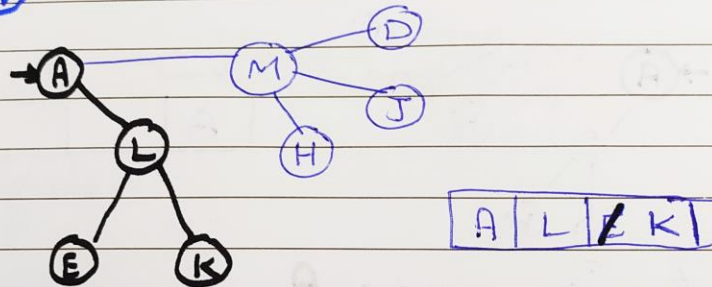
(P.T.O)

Step (iii)



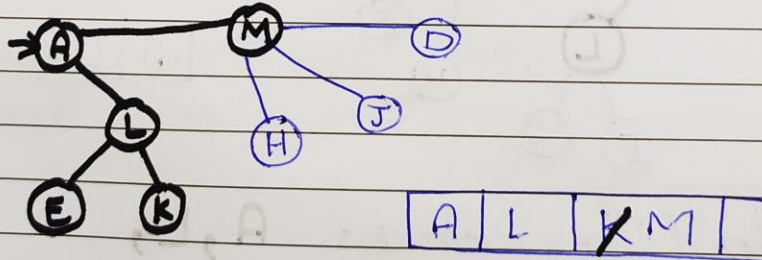
Output Sequence : A, L, E

Step (iv)



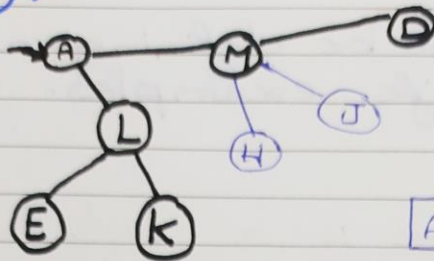
Output Sequence : A, L, E, K

Step (v)



Output Sequence : A, L, E, K, M

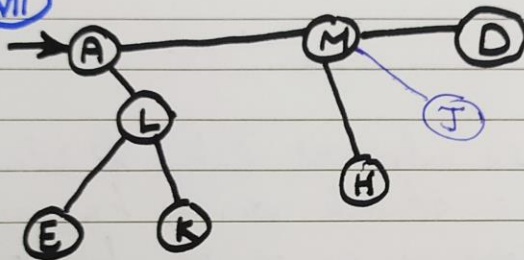
Step (vi) :-



ALMD

Output Sequence: A, L, E, K, M, D

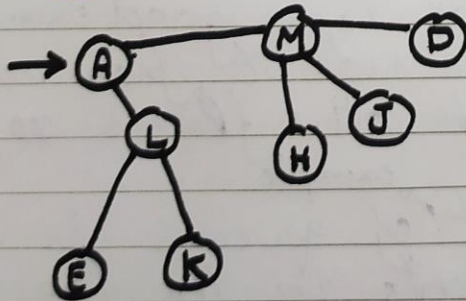
Step (vii)



ALM ~~H~~

Output Sequence: A, L, E, K, M, D, H

Step (viii)



ALM ~~H~~ J

Output Sequence: A, L, E, K, M, D, H, J

Q3 How would you be defining a Queue?
Give real life examples.

Queue:

A queue is a container of objects that are inserted and removed according to the first-in ~~is~~ first-out principle.



Queues are almost like stacks but however stack only have one end where as queues have two open ends. One side used for inserting data and other for deleting that data.

Example:

- An escalator is a good example of queue: people ride it from one end and reach other floors ~~or~~ from the other end. example
- An excellent ^{example} of queues is a line of students in the food court of the school.